

Claims

1. A method of treating an allergy in a subject susceptible to an anaphylactic allergic response to an allergen, the method comprising steps of:

5 providing a composition comprising microorganisms that produce the allergen; and administering the composition to the subject at an effective and non-toxic dose.

2. The method of claim 1, wherein in the step of providing, the microorganism is selected from the group consisting of: bacteria, fungi, viruses, algae, and protozoa.

10 3. The method of claim 1, wherein in the step of providing, the microorganism is selected from the group consisting of: gram-negative bacteria, gram-positive bacteria, and yeast.

4. The method of claim 1, wherein in the step of providing, the microorganism is selected 15 from the group consisting of: *E. coli*, *Lactococcus*, *Listeria*, *Vibrio*, *Salmonella* and *S. cerevisiae*.

5. The method of claim 1, wherein in the step of providing, the allergen is found in foods, venoms, or latex.

20 6. The method of claim 1, wherein in the step of providing, the allergen is a protein found in peanuts, milk, eggs, seafood, nuts, dairy products and fruit.

7. The method of claim 1, wherein in the step of providing, the allergen is a protein found in bee venom.

25 8. The method of claim 1, wherein in the step of providing, the allergen is Ara h 1, Ara h 2, Ara h 3, or a polypeptide portion thereof.

9. The method of claim 1, wherein in the step of providing, the allergen is protein modified

to have a reduced ability to bind and crosslink IgE antibodies.

10. The method of claim 1, wherein in the step of providing, the microorganisms produce a portion of the allergen.

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11. The method of claim 10, wherein in the step of providing, the portion of the allergen produced has a reduced number of IgE binding sites as compared to the allergen.

12. The method of claim 1, wherein in the step of providing, the allergen is a polypeptide
10 and production of the allergen is inducible; and wherein after the step of administering, the method further comprises the step of inducing expression of the polypeptide.

13. The method of claim 12, wherein in the step of inducing, the polypeptide is secreted into a periplasm or secreted outside the cell.

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14. The method of claim 1, wherein the step of providing comprises providing a composition comprising gram-negative bacteria or yeast that secretes the allergen into a periplasm.

15. The method of claim 1, wherein in the step of providing, the allergen is a small molecule.

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16. A composition comprising a microorganism that produces an allergen that elicits an anaphylactic allergic reaction in a subject allergic to the allergen.

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17. The composition of claim 16, wherein the allergen is a polypeptide or small molecule.

18. The composition of claim 16, wherein the microorganism is selected from the group consisting of: bacteria, fungi, viruses, algae, and protozoa.

19. The composition of claim 16, wherein the microorganism is selected from the group

consisting of: gram-negative bacteria, gram-positive bacteria, and yeast.

20. The composition of claim 16, wherein the microorganism is selected from the group consisting of: *E. coli*, *Lactococcus*, *Listeria*, *Vibrio*, *Salmonella* and *S. cerevisiae*

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21. The composition of claim 16, wherein the allergen found in foods, venoms, or latex.

22. The composition of claim 16, wherein the allergen is an allergen found in peanuts, milk, eggs, seafood, nuts, dairy products and fruit.

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23. The composition of claim 16, wherein the allergen found in bee venom.

24. The composition of claim 16, wherein the protein is Ara h 1, Ara h 2, Ara h 3, or a polypeptide portion thereof.

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25. The composition of claim 16, wherein the allergen is modified to have a reduced ability to bind and crosslink IgE antibodies.

26. The composition of claim 16, wherein the microorganism produces a portion of the allergen.

27. The composition of claim 16, wherein the portion of the allergen produced has a reduced number of IgE binding sites as compared to the allergen.

28. The composition of claim 16, wherein production of the allergen is inducible.

29. The composition of claim 16, wherein the allergen is a polypeptide which is secreted into a periplasm or secreted outside the cell.

30. The composition of claim 16, wherein the microorganism is a gram-negative bacteria or yeast that secretes the allergen into a periplasm.

31. A pharmaceutical composition comprising microorganisms that produce an allergen that
5 elicits an anaphylactic allergic response in a subject susceptible to the anaphylactic allergic response, and further comprises an pharmaceutically acceptable carrier.

32. The pharmaceutical composition of claim 31, wherein the allergen is a polypeptide or a small molecule.

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33. The pharmaceutical composition of claim 31, wherein the microorganisms produce a portion of an allergen that elicits an anaphylactic allergic response in a subject susceptible to the anaphylactic allergic response.